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METHOD AND DEVICE FOR THE TRANSMISSION OF SHORT MESSAGES IN  
TELECOMMUNICATIONS NETWORKS  
[Verfahren und Vorrichtung zur Übertragung von Kurznachrichten in Telekommunikationsnetzen]

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The invention relates to a method for the transmission of short messages in telecommunication networks according to the features of the preamble of Claim 1.

The sending and receiving of short messages (SMS) in digital mobile wireless networks already has been the state of the art for several years. Due to the increasing acceptance of this communications possibility existing apart from telephony, converters (gateways) have been implemented between SMS and emails, such that SMS messages can be sent and received as emails and emails as SMS messages. Indeed, this has further boosted acceptance, yet it requires the presence email access in order to send and receive short messages.

In addition, converters for the sending of SMS were implemented on fax devices. Due to the requisite long connecting times in order to negotiate the transmission rate and in order to transmit at least one fax page, the fee assessment for this service, however, is quite costly, making this less attractive. Sending faxes on SMS has previously not been possible and will not be able to be realized in the near future, due to the dearth of automation to reduce the information content of a fax to a small data quantity (e.g., 160 characters for GSM SMS).

In other respects, reaching subscriber lines having analog user devices, which continue to make up the predominant majority of all lines, has previously not been possible from the SMS world.

The purpose of the invention therefore is to propose a method and a device for the transmission of short messages in telecommunications networks, which enables the transmission of any desired short messages to subscriber lines having analog user devices.

This problem is solved by means of the characterizing features of the independent claim.

Two components are required in order to realize the method: a gateway for converting the content of SMS into a format suitable for transmission up to said analog user device and a terminal (TIX: Textual Information Exchange) for coding, or decoding, SMS content on the user side.

The aforementioned method advantageously enables the transmission of individually configurable content of SMS to subscriber lines having analog user devices, in that the content of the SMS is converted into signals in such a way that transmission up to an analog user device is possible (e.g., by means of signaling tones within the telephony bandwidth or through the transmission of information in the call control signal according to European Telecommunications Standard ETS 300659-1, or, during an existing connection, according to ETS 300659-2). Transmission in the inverse direction likewise is enabled.

Due to the low data quantity with SMS (160 characters in the GSM system), transmission of content requires a substantially shorter time than is the case, e.g., for a fax. This enables, even for a target address in a foreign country, a transmission which is cost-effective and therefore of interest to the user.

In addition, the method gives rise to the possibility of sending SMS out from analog lines. Finally, the thereby possible conversion into emails enables a cost-effective sending and receiving of short emails out from an analog line.

Advantageous embodiments and improvements of the invention are the object of the dependent claims.

In the following the invention will be expounded upon with the aid of the enclosed drawing. In this connection, additional characteristics and advantages of the invention arise from the drawing and description thereof.

The single drawing shows general various telecommunications networks, such as a GSM mobile wireless network (1), public landline (2) (PSTN) and internet (3), which are connected to each other by means of appropriate gateways. The public landline (2) in particular, possesses user connections (6, 7) having analog user devices (8-12), such as a telephone or telefax, which now receive, according to the invention, SMS messages, e.g., from the GSM mobile wireless network (1) and also can send to same.

The central element for execution of the aforementioned method is the (TIX) gateway (4). The primary function of the gateway (4) is conversion of SMS content to a format (e.g., DTMF tones or modem tones) suitable for transmission to an analog user device. The gateway (4) is interfaced on one side to the Short Message Service Center (5) (SMSC) of the mobile wireless network (1). Realized on the other side is an interface to a public telecommunications network (2) with subscriber lines (6, 7) having analog user devices (8-12).

Required on the side of the analog user devices (8-12) for sending and receiving SMS is a terminal (TIX), which makes the transmitted SMS information readable for analog user devices. In this connection, this is a matter of a low-cost user device consisting of a keypad, display, and the requisite control logic, which can be connected to a telecommunications network by means of an A-B interface. The TIX can be implemented either as a self-contained user device (9, 12) or as part of an existing user device (11) (telephone, fax or PC) or as a series connection unit (16) for a user device (10).

The transmission of a short message (SMS) to an analog user device occurs as follows:

A mobile wireless user device (13) or by a personal computer (14) transmits, via internet and email gateway (15) a short message (SMS) for an analog user device (8-12), which arrives at the short message service center (5) (SMSC). The gateway (4) obtains the short message from the (SMSC) (5) and produces a connection to the indicated target address (call number) of the analog user device (8-12). The SMS content present in digital form now is converted in signals in such a way that transmission is possible to the called analog user device (8-12). These can be analog tone signals having certain frequencies within the telephony bandwidth. After successful transmission of the SMS content and, if applicable, some additional information (sender, sending time, etc.) the call is dismantled by the gateway (4). If needed, the analog user device (8-12) can send back an acknowledgment by means of the gateway (4) to the SMSC (5).

As an alternative to a transmission of tone signals within the telephony bandwidth, a modulation of the call signal also can be undertaken, such as that already common today (according to ETS 300 659-1) with the call number display (caller ID) for analog connections. Admittedly, an interaction between gateway (4) and the telephone exchange of the landline (2) generating the call tone presumably is required. An advantage, however, in this connection is that transmission of the SMS is already possible as early as during the call tone phase (signaling-connection) and is possible without actual development of processing a call. Transmission of the SMS according to ETS 300659-2 is also conceivable. In this case, an interaction with the telephone exchange likewise would be required. It would however be an advantage, nonetheless, that an SMS would reach the user even during an existing call (reachability per SMS for a busy line).

In contrast to the previous use of the standard ETS 300659-1 or ETS 300659-2, in this case a transmitted message can be individually configured by the calling side.

If SMS content is not transmitted according to ETS 300659-1 or ETS 300659-2, transmission of the SMS can, if the subscriber line is busy, be repeated at a later point in time. Control for this can occur either by means of the SMSC (5) or by means of the gateway (4) itself.

If transmission of the SMS has failed since no corresponding terminal (TIX) has answered at the analog subscriber line (8-12), then a non-receipt confirmation or an error report is transmitted back to the SMSC (5). This does not apply for transmission according to ETS 300659-1 and ETS 300659-2, since there is no acknowledgment from the receiver side for this purpose. The transmission path from an analog user device (8-12) to the short message service center (5) is as follows:

For this purpose, as further described below, a call is established, e.g., from the TIX (9 or 12) to the gateway (4). The gateway (4) accepts the call and receives the content of the SMS and possible additional information in the form of various tones. After conversion thereof into the digital SMS

format, said information is transmitted to the SMSC (5) from where it can be relayed to the predetermined receiver, either as an SMS to a mobile wireless subscriber (13), by means of the email gateway (15) to an email address, by means of a fax gateway (17) to a fax device (18), etc. Fee assessment for the service can occur by means of the call from the TIX (9) to the gateway (4).

Finally, transmission of an SMS between an analog user device and another analog user device also is possible. Said transmission directly between analog user devices preferably occurs under circumvention of the gateway (4). For this purpose a telecommunications connection is established between the corresponding analog lines (9, 12) and the message transmitted by means of frequencies within the telephony bandwidth. In this case, a functionality is to be provided in the user devices (9, 12) for attending to special cases (no compatible user device present on the line, line busy, call not accepted, etc.).

In general, it bears mention for the receipt of SMS, that if an SMS is sent to a subscriber line (8-12) equipped with a TIX, the aforementioned gateway (4) establishes a call to said subscriber line (8-12). The call is accepted by the TIX, and after a brief handshake, the gateway (4) can transmit the content of the SMS (160 characters) and, possibly, some additional information (sender, time of transmission, etc.) to the TIX. After the transmission has been effected the call can be dismantled and the received information displayed on the display of the analog user device. Alternatively, the transmission can occur, as mentioned above, according to the standardized method according to ETS 300659-1 (modulation of the call sign).

When sending an SMS from the TIX (9, 12), the text of an SMS is entered by means of a keypad or by means of another suitable interface and is provided with a target address. This usually is a question, in this case, of a mobile wireless call number of a subscriber (13). However, email addresses, other landline telephone or fax numbers can be indicated as the target address. The TIX (9, 12) produces a

connection to the gateway (4) or directly to another TIX and transmits the content of the SMS together with the target address there. In the gateway (4) the content of the SMS is converted and relayed to the target address in the aforementioned way.

### Claims

1. Method for the transmission of short messages in telecommunications networks, characterized by: receipt of a short message transmitted by a short message service center (SMSC) in a network-overlapping gateway; conversion of the content of the short message (SMS) to a suitable format for transmission to an analog user device; establishment of a (signaling) connection to the analog user device and transmission of the converted short message; and coding or decoding of the SMS content by means of a terminal (TIX) connected to the user device.

2. Method according to Claim 1, characterized in that transmission of the short message from an analog user device to the receiver occurs by means of: coding or decoding of the SMS content by means of the terminal (TIX); establishment of a connection between the terminal (TIX) and the gateway; receipt of the content of the SMS in the form of tone signals in the gateway; conversion of the message to the digital SMS format; and transmission of the information to the short message service center (SMSC) and relay to the predetermined receiver.

3. Method according to Claim 1 or 2, characterized in that the short message is transmitted in the form of analog tone signals of certain frequencies.

4. Method according to Claim 1 or 2, characterized in that the short message is transmitted according to Standard ETS 300659-1 and/or ETS 300659-2.



5. Method according to one of Claims 1-4, characterized in that additional information is transmitted apart from the short message.

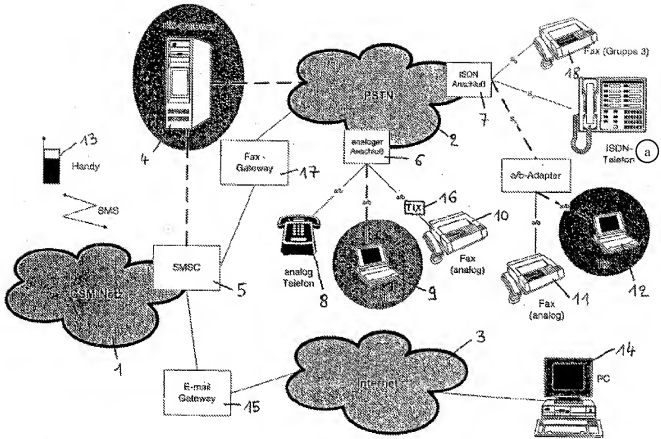
6. Method according to one of Claims 1-5, characterized in that an acknowledgment for the short message is sent from an analog user device via the gateway to the short message service center (SMSC).

7. Method according to one of Claims 1-6, characterized in that the gateway is connected both to the short message service center of a mobile wireless network as well as to telephone exchanges of at least one additional telecommunications network.

8. Device for executing the method according to Claims 1-7, characterized by a gateway (4) overlapping a telecommunications network for converting the content of received SMS to a format suitable for transmission to the sender or receiver and a terminal (TIX) on the side of the analog subscriber line (8-12) for coding or decoding the SMS content received or to be sent.

9. Device according to Claim 8, characterized in that the terminal (TIX) is designed both as a self-contained user device (9, 12) as well as part of an existing user device (11) or as a series connection unit (16) for a user device (10).

Fig. 1



- |      |    |                  |
|------|----|------------------|
| Key: | a  | ISDN telephone   |
|      | 1  | GSM network      |
|      | 6  | Analog line      |
|      | 7  | ISDN line        |
|      | 8  | Analog telephone |
|      | 9  | TIX              |
|      | 13 | Cell phone       |
|      | 18 | Fax (group 3)    |